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+ CONTRIBUTIONS TO AGRICULTURAL SCIENCE AND  
TECHNOLOGY BY FOREIGN VISITORS TO THE UNITED STATES +

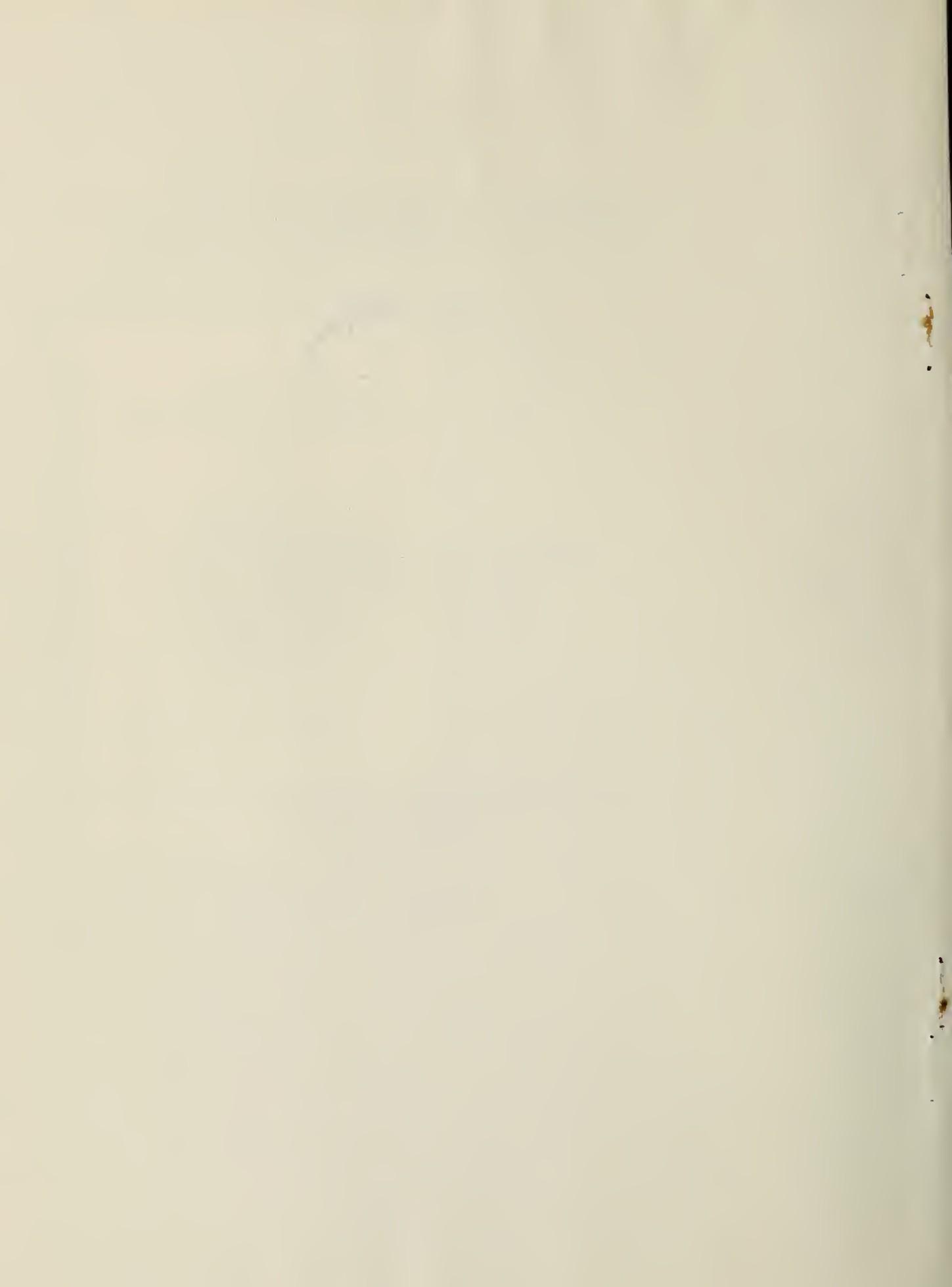


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During the past few years the Government of the United States as part of the program of the Foreign Operations Administration has sponsored an extension of technical assistance and cooperation in agricultural science and technology to other parts of the world. The original concept and intent of this program was to create a firm economic base for the democratic aspirations of the citizens of other countries of the world in order to prevent their acceptance of false doctrines and ideologies that would be contrary to the benefit of the agriculture and industry of the United States.

In order to assist other countries requesting aid in the technology of agriculture, scientists, technicians and agricultural officials have been brought to the United States to study and observe the organization, functions, and techniques of our agricultural institutions and agricultural industry and to take part in our research and educational operations.

During the course of providing the foreign visitors with opportunities to study our agriculture our own U. S. technicians have at the same time obtained information of value to them and to U. S. agriculture.

Some of the contributions made by foreign visitors are listed to show the nature of the interchange in terms of the value to the United States. In addition to the concrete examples of assistance given to the United States it is to be noted that frequent mention is made by our U. S. technicians of the intangible values in the development of better international understanding and appreciation of mutual problems made possible by the international interchange of persons.

Contributions of Foreign Visitors to the Technical Knowledge  
of the Research Workers in the Animal Disease and Parasite Research  
Branch at ARC, Beltsville, Md.

Dr. R. Alexander, Director, Veterinary Services, South Africa. Visited April 21, 1953.

Dr. A. H. Frank, Animal Disease Station, reports that Dr. Alexander lectured and showed pictures (to Animal Disease Staff) on Exotic Diseases. These diseases are those we do not now have in this country but which are threatening to enter the U. S. at any time. An example would be Epivaginitis which is thought to be caused by a virus which renders bulls permanently sterile. This sterile condition is brought about by its setting-up of inflammation, causing no sperm to be produced. Rinderpest - a virus disease which causes a high death rate in animals is another exotic disease. By learning about methods of control, our technicians are better prepared to cope with the diseases if they should occur in the U. S. and to prevent their entering the U. S. Dr. Alexander also pointed out wild animal reservoirs of these diseases in South Africa.

Dr. F. Blom, State Veterinary and Serum Laboratory, Copenhagen, Denmark. Visited 1953.

Dr. A. H. Frank, Animal Disease Station, reports that Dr. Blom showed our workers the significance of abnormal spermatozoa in breeding males and the technique used in the preparation of spermatozoa for staining for microscopic

examination. He set up a classification for spermatozoa, dividing them into primary and secondary forms - primary meaning before they leave the testicles of the male and secondary meaning afterwards. Dr. Blom's work was based on semen examinations from 2000 bulls, and his findings have been of value in the USDA research on semen and breeding studies.

Dr. G. Maestrone, University of Milan, Celoria 10, Milan, Italy. June 23, 1954.

Dr. A. H. Frank, A.D.S., states that Dr. Maestrone gave information of value on the hydrogen peroxide treatment of trichomoniasis in cattle. Also furnished information on vibriosis and techniques of artificial insemination in relation to animal diseases.

Dr. J. I. Terpstra, Ryksseruminrichting, Rotterdam, W. Holland. 1953.

Dr. A. H. Frank, A.D.S., reports that Dr. Terpstra has contributed valuable information to cultural isolation of vibrio from the reproductive tracts of cattle. He warned against the spread of vibrio through artificial insemination.

Dr. Van der Sluis, Gerondheidsdienod voor vet, Leenwarden, Nederland. Spring 1953.

According to reports by Dr. A. H. Frank, A.D.S., Dr. Van der Sluis gave our workers procedures used in Holland to control and eradicate venereal diseases in cattle (vibrio and trichomoniasis) and brucellosis.

Dr. Georg Wellman, Fulbright Scholar, Berlin, Germany. Ten months study Sept. 21, 1954, to June 1955.

Dr. R. D. Shuman, A.D.S., states that Dr. Wellman's work at his laboratory has been valuable for two main reasons -

1. Dr. Wellman has qualified the work perspective since his viewpoints and approach to animal disease research and laboratory procedures have been somewhat different from those of technicians in U.S. His experiences and divergent views on disease problems have contributed to a much broader perspective of them.

2. Specifically, Dr. Wellman has developed a serological test for identifying resistant or susceptible individuals in swine with respect to swine erysipelas.

Also Dr. T. R. Good, A.D.S., reports that Dr. Wellman has described a cover glass culture technique for observing growth of individual bacteria in all diseases.

Dr. Y. P. Liu, Head Professor of National Taiwan University, Taipei, Formosa. August 18, 1953.

Dr. W. J. Hall, A.D.S., reports that Dr. Liu gave details concerning a new method of Gram staining of bacteria.

Dr. R. Rastegar, Professor, Veterinary Faculty, Tehran University, Tehran, Iran. October 8-9, 1952.

Dr. W. J. Hall, A.D.S., says that Dr. Rastegar described a method of making a pasteurella vaccine using saponin.

Dr. Hasip Kurtpinar, Ankara, Turkey.

Dr. F. W. Price and Dr. Allen McIntosh, Zoological Section, report that Dr. Kurtpinar's visit to their laboratories initiated his interest in ticks, as a result of which he did very intensive work on ticks in his country. He followed this with a publication in 1954 entitled "Turkiye Keneleri," a copy of which he furnished the Zoological Laboratories. Through this publication we obtained a knowledge of the conditions and problems with respect to ticks and other parasitic troubles in the Near East.

Dr. Satyu Yamaguti, Professor, Okayana University, Okayana, Japan. Studying at Zoological Section Feb. 23, 1954, to Feb. 1955.

According to Dr. F. W. Price, this man is probably the most outstanding parasitologist in Asia. Dr. Yamaguti is preparing a classification of systems in helminthology, which will be published in three volumes; namely, (1) Flukes, (2) Tapeworms, (3) Roundworms. These volumes will cover the subject the world over and will be of great value to the whole field of parasitology. By using the index located at Zoology library, he is making a contribution to the U. S. Department of Agriculture as well as to the entire world.

Dr. Antonio Meis, Jr. Head of Artificial Insemination Service, Sao Paulo, Brazil. February 20 to March 27, 1952.

Dr. A. H. Frank, A.I.S., reports that he received valuable information on artificial insemination methods in sheep and cattle. Dr. Meis sent to Dr. Frank an electrical ejaculator for cattle, which was of value as an example of a different technique.

#### Animal and Poultry Husbandry Research Branch

Dr. G. R. L. Sykes, Member, British Poultry Mission, Wiltshire, England. March 10-13, 1952.

Dr. C. W. Knox and Dr. Wm. Shaklee, Poultry Section, report that Dr. Sykes presented an idea for the progeny testing of sires at a minimum of expense. According to his plan, in each hatch the progeny of a sire would be placed with a grower probably at somewhat less than prevailing prices with the understanding that a very few records would be carefully kept. No trapnesting would be necessary but egg production and mortality records would be recorded daily. By placing the progeny of a sire with several growers at random in different localities, an unbiased estimate of the transmitting abilities of the sire could be obtained in comparison with other sires treated similarly. This plan could be used to advantage when it is desirable to test the progeny of sires under different environmental conditions, or to progeny test a larger number of sires than possible with station facilities.

Dr. John Hancok, Animal Geneticist, Rakura Experiment Station, New Zealand.  
1953.

Dr. W. M. Dawson, Cattle Section, states that Dr. Hancok gave him a new idea concerning the use of identical twins to estimate the portion of inheritance not due to additive genetic inheritance.

Dr. Jan C. Bonsma, Research Officer, Pretoria, Union of South Africa. Oct. 30, 1953.

Dr. W. M. Dawson reports that Dr. Bonsma pointed out and discussed the possibility of selection, which we have, for resistance to tropical and sub-tropical conditions within our cattle of European origin.

Mr. T. Peter Phillips, Milking Shorthorn cattle breeder, England. Holder of Nuffield Fellowship. October 1, 1953.

Pr. W. M. Dawson, in a discussion of Milking Shorthorn breeding problems with Mr. Phillips, says that he recommended the use of only Milking Shorthorn sires with 10 generations of dams with 10,000 lbs. of milk production. This is a practice that should lead to much improvement in dual-purpose herds.

Pr. Lawrence Seekles, Head, Dept. Vet. Bio. Thermo., Utrecht University, Holland. January 17, 1952.

Pr. R.F. Davis states that Pr. Seekles gave a resume of their experiences in Holland and suggestions as to how our scientists might best work on the problems of grass tetany and wheat poisoning in Texas and other areas. Dr. Seekles is reported to have spent 25 years on these problems in his country. More specifically, information was obtained on the methods they use for analysis of minerals.

Dr. George R. Moule, Head of Sheep Research, Queensland Station, Brisbane, Australia. July 10-11, 1952.

Mr. F. A. Spencer, Sheep Section, obtained first hand information on Australian sheep husbandry techniques and Australian topography. This provided a comparison of the sheep husbandry practices of the two countries with new ideas for improvements. Dr. A. H. Frank, Animal Disease Station, also in talking with Dr. Moule, learned about sub clover (Trifolium subterranean) pasturing. Sheep on this pasture obtained too much estrogen. Analysis of the clover showed that it contained a large amount of estrogen, producing activity in wethers, which caused them to secrete a little milk and show mammary growth.

Pr. H. J. Lee, Principal Research Officer, University of Adelaide, Australia. September 21, 1954.

As a result of his visit here Dr. Lee has loaned to us a liver biopsy apparatus which Dr. Roman Kulwich of the nutrition laboratories has been able to have a copy made. This will be of much help in our work. In addition, Dr. Lee's discussions of a possible interaction of molybdenum and sulfur in sheep nutrition were quite interesting. The research workers at Beltsville are investigating at the present time such a possible interaction by the use of radioactive sulfur with rabbits.

Dr. J. S. Falconer, Geneticist, Institute of Animal Genetics, Edinburgh,  
Scotland, December 1954.

Mr. John H. Zeller and Dr. H. O. Hetzer, Swine Section, report that their discussions with Dr. Falconer proved very fruitful. He told them of his selection experiments and how we might amplify the design of our swine breeding experiments to obtain answers to certain questions regarding the effect of selection, where selection is practiced in opposite directions. An example of this latter type of selection is the one now being put in operation at Beltsville for high and low levels of fat in swine.

Dr. Kurt Wagener, Professor of Bacteriology, Hanover, Germany.

During a visit of six months in 1951, Dr. Wagener suggested fundamental changes in our efforts to control x-disease in livestock, which eventually lead to marked improvement of our entire program of research and control.

Yao, T. S., sponsored by Emergency Aid Program to Chinese Students and Scholars of Chinese Assistance Branch, Special Services Division, International Educational Exchange Service, Department of State.

Dr. Yao served from April 2, 1951, to October 1, 1954, as a research scholar with Animal and Poultry Husbandry Branch of the Agricultural Research Service. His assignment consisted of statistical analyses of animal production and genetics data and led to the following publications:

1. Heritability of milk production in Milking Shorthorn Cattle by T. S. Yao and O. N. Paton in Journ. of Animal Science August, 1954.
2. Heterosis in birth weight and slaughter weight of rabbits by T. S. Yao and O. N. Paton in Genetics, September, 1954.
3. A preliminary report of the observations of the parethenogenetic embryonic tissues from virgin turkey eggs by T. S. Yao and Marlow W. Olsen in Journ. of Hered. (in press).
4. Body measurement indexes as means of selection in Shorthorn Cattle, by T. S. Yao, R. L. Hiner and W. M. Dawson.
5. A study of the quantitative and qualitative characters of the beef-eye-muscle by R. L. Hiner and T. S. Yao.
6. Inheritance of black fibers and skin color and their relation to production characters in Hampshire sheep by T. S. Yao, Thomas D. Watkins, Jr., Carl G. Potts and Damon A. Spencer. (The last three articles were presented before the Animal Production Society in Chicago in November, 1954).

### Sugar Plants

#### Savitsky, V. F. and Helen

Numerous articles in the Proc. Amer. Soc. of Sugar Beet Technologists, Vols. 6, 7 and 8 on sugar beet improvement, monogerm breeding, cytology and genetics. (The Savitskys are collaborators with the USDA at the U. S. Sugar Crops Field Station at Salt Lake City, Utah, and employees of the Beet Sugar Development Foundation. The Savitskys are Russian born.

Lund, Viggo of Denmark contributed 28 seed lots of Beta maritima, a wild beet of Europe containing genes for leaf spot resistance and high sucrose for use of U. S. beet sugar plant breeders.

Archimovitsch, Alexander. Contributions of translations of Russian articles on sugar beet breeding.

Van Tillewijn, C. Author of the book Botany of Sugarcane in 1952. (With cooperation of F. W. Brandes at Beltsville). Formerly Director, Sugar Experiment Station, Cheribon, Java.

### Potato

Swaminathan, M. S. and Howard, H. W. The Cytology and Genetics of the potato (Solanum tuberosum L.) and Related Species. Published in The Hague by Martinus Nijhoff, 1953.

Lunden, Aksel P. Inheritance Studies in the Potato (Solanum tuberosum L.) 1937. Basic studies showing that potato genetics work on a tetrasomic rather than a disomic basis.

Elack, William of Scotland. Basic contributions in late blight resistance studies and collaboration with L. C. Peterson of Cornell, W. R. Mills of Pennsylvania State, M. F. Gallegly, Jr. of West Virginia and C. Mastenbroeck of Holland on the International System of Designating Inter-relationships of Genes and Races.

de Souza, Paulo of Brazil published with Reiner Bonde of Maine on Studies on the control of Potato Bacterial Seed-Piece Decay and Blackleg with Antibiotics in the American Potato Journal in October, 1954.

Mastenbroeck, C. of Holland and William Black of Scotland sent potato materials having resistance to the golden nematode. Also sent material for use as testers for late blight.

### Tobacco

Tso, T. C. and Jeffrey, R. N. Paper Chromatography of Alkaloids and their Transformation Products in Maryland Tobacco. Archives of Biochemistry and Biophysics Vol. 43(2). Mr. Tso sponsored by Emergency Aid Program to Chinese students and Scholars, Chinese Assistance Branch, Special Services Division, International Educational Exchange Service, Department of State.

Mr. Tso's work is now being supported by the University of Maryland because of its value to the Maryland tobacco industry.

### Phytopathology

Cheo, Pen Ching Mr. Cheo was originally sponsored by the Chinese Assistance Branch, International Educational Exchange Service, Department of State as a Research Scholar stationed at the Plant Industry Station, Beltsville, Maryland. He is credited with the following publications:

1. Varietal Differences in Susceptibility of Sweet Potato to Black Rot Fungus. *Phytopath* 43(2)78-81. February, 1953.
2. A New Strain of Tobacco Ringspot Virus Isolated from Bean. *Plant Disease Reporter* 36(12) December 15, 1952 (Co-author, W. J. Zaumeyer).

Costa, Alvaro S. of Brazil. Recognition of the new virus disease tomato yellows in California. Outstanding cooperative work on sugar beet virus yellows with Dr. C. W. Bennett at Riverside, California. Recognition of a kenaf disease in Florida similar to a Brazilian cotton disease and reported in collaboration with Dr. T. J. Grant.

de Segura, Mrs. Consuelo Bazan of Peru has made two outstanding contributions:

1. her discovery of the presence of the golden nematode (Heterodera rostochiensis) of potato in Peru and the formulation of the opinion that the golden nematode might possibly be indigenous in the Andes and that it might possibly attack other plants in addition to the potato, Solanum andigenum;
2. her work on the physiological races of late blight of potato in Peru.

In this connection she has conducted several related studies, viz.: investigations for obtaining varieties resistant to this disease; studies on the relation of late blight to environmental factors; the possibility of establishing a warning service to aid in the employment of agriculturists of timely and effective control measures, and, lastly, experiments with different fungicides to find the effective means and agents for control of this disease.

Mrs. de Segura has also contributed to our knowledge of the world-wide distribution of plant diseases by publishing a list of fungi known to exist in Peru.

The following is a selected list of Mrs. de Segura's publications:

1950 - Posibilidad de pronosticar la iniciacion y progreso del "hielo" de la Papa (Phytophthora infestans). Boletin 39, 12 pp. Departamento de Fitopatologia, Centro Nacional de Investigacion y Experimentacion Agricola, La Molina, Peru.

1951 - Trabajos preliminares para la obtencion de variedades de Papa resistentes al "hielo" (Phytophthora infestans) en el C.N.I.F.A. de La Molina.

Reaccion de las variedades de Papa Peruanas al "hielo" (Phytophthora infestans (Mont.) de Bary). Boletin 43, 24 pp.

1951 ~ Plant Diseases New to Peru. Plant Dis. Repr. 35:465-466.

1952 ~ The Golden Nematode in Peru. Plant Dis. Repr. 36:253

1952 ~ Razas Fisiologicas de Phytophthora Infestans en el Peru,

Investigaciones sobre resistencia de especies variedades e hibridos de Papa al Phytophthora Infestans en el C.N.I.E.A. "La Molina" 1951, Boletin 46, 16 pp.

(This work was presented by Mrs. Segura at the II Latin-American Reunion of Geneticists and Phytoparasitologists held in Brazil in April, 1952).

1953 ~ "El hielo Amarillo" enfermedad bacteriana del Frijol en el Peru.

Boletin 50, 15 pp.

(First determination for Peru of the presence of halo blight of bean).

y Jose M. Lamas Carrera. 1953. Experimento comparativo de fungicidas para el control del "hielo" de la Papa en el Valle de Carabayllo. Informe 81, 16 pp.

Deslandes, Josue A., Bardin, Roy and Snyder, W. C.

Perithecia of Erysiphe Cichoracearum on Lettuce in the Field. Plant Disease Reporter 37 (3) March 15, 1953. (Deslandes: Plant Pathologist, Instituto Agronomico, Pelotas, Brazil).

#### Nematology

A. L. Taylor, V. H. Dropkin and G. C. Martin. "Perineal Patterns of Root-Knot Nematodes". Phytopathology (in press) (Mr. Martin was the visitor).

Oteifa, B. A. 1951. Effects of potassium nutrition and amount of inoculum on rate of reproduction of Meloidogyne incognita. Jr. Washington Acad. Sci. 41(12):393-395.

Oteifa, B. A. 1952. Effect of potassium nutrition and amount of inoculum on rate of reproduction of the root-knot nematode Meloidogyne incognita (Abs.) Phytopathology 42(1):15.

Oteifa, B. A. Influence of potassium nutrition of the host on the reaction of Lima bean plants to infection by a root-knot nematode, Meloidogyne incognita, (Abs.) Phytopathology 42(6):343. 1952.

Oteifa, B. A. Development of the root-knot nematode, Meloidogyne incognita, as affected by potassium nutrition of the host. Phytopathology 42(4):171-174. 1953.

Oteifa, B. A. Nutrition of lima bean Phaseolus lunatus L. in relation to disease development incited by a root-knot nematode, Meloidogyne incognita and to development of the pathogen. Thesis for Degree Ph.D., University of Maryland, 54 pp. 1953.

Lordello, L.G.F. 1955. Piscolaimus auritus n. sp., from Brazil. Proc. Helm. Soc. Wash., (in press).

Lordello, L.G.F. 1955. Xiphinema krugi n. sp. (Nematoda, Dorylaimidae) from Brazil with a key to the species of Xiphinema. Proc. Helm. Soc. Wash. (in press).

Lordello, L.G.F. 1955. A new nematode, Rotylenchus melancholicus n. sp., found associated with grass roots, and its sexual dimorphism. Jour. Wash. Acad. Sciences. (in press).

Evaluation of contributions by foreign trainees to U. S.  
Agriculture at the U. S. Salinity Laboratory, Riverside, California,  
by  
H. F. Hayward, Director

The following is an assessment and evaluation of the direct and indirect contributions made by foreign trainees to the agricultural industry of the United States during their study terms at the Salinity Laboratory.

The contributions which we might indicate at the present time are largely indirect ones which relate to the visits at the Laboratory of a number of well-trained scientists from other countries. During the past two years, we have had residence at the Laboratory several well-trained foreign soil scientists, including Dr. C. L. Mehrotra from India, Mr. H. S. Zaidi from Pakistan, and Mr. Arnauld Haspil from Haiti. We have also been in close touch with Dr. M. L. Dewan of Iran who visited the Laboratory a few years ago.

In each of these instances, the visiting scientists have brought with them representative saline and alkali soil samples from their respective countries, and they have worked out critical studies of the physical and chemical characteristics of these soils, in conjunction with members of our staff. The net effect of this trainee undertaking has been that we have been able to instruct these foreign scientists in the methods and techniques used by the Salinity Laboratory. On the other hand, the Laboratory has benefited indirectly by the additional information that we have gained regarding the world-wide distribution of saline and alkali soil conditions, which serves to broaden the background of our research staff. In many of these countries, the saline and alkali soils problems have been ones of very long standing, and there is, therefore, a history regarding the attempts which have been made to improve unfavorable soil conditions and accomplish adequate reclamation.

While this foreign-aid work has been in progress for only two years, we feel that ultimately the continued contacts with qualified soil scientists from other countries will gradually build up a very important back-log of reference material regarding the basic problems upon which the Salinity Laboratory is working.

There are, of course, many other intangible benefits which we cannot very well assess at this time. I have reference particularly to the increasing awareness of foreign soil scientists in the work and objectives of the Salinity Laboratory. As a result of the visits of foreign scientists, the work of the Laboratory is becoming better known each year, and we are developing cordial working relations with a number of scientific institutions and scientific personnel in the Near East, Far East, North African, and South American countries.

Although the benefits received from foreign trainees up to the present time do not represent a very large contribution, it is our opinion that, in the long run, the sum total of information obtained through the foreign trainee program will be a most valuable asset to the Laboratory work and to members of its staff.

#### Contributions of Washington Utilization Research Branch

Mr. Alf Howard, In Charge, Brisbane Branch Lab. Div. of Food Preservation, Brisbane, Australia. February 28-29, 1952.

Mr. Wm. Sulbacher, Meat and Meat Products Section, learned of the types of meat research pursued in Australia. He learned that Freon gas is being used in a direct expansion system for new processing plants. Mr. Howard gave details on frozen meat methods for comparison with our own. He also gave details on frozen meat methods for comparison with our own. He also indicated that there is not much interest in pork in Australia.

Dr. J. G. Sharp, Research Biochemist, Low Temperature Research Sta., Cambridge, England. June 18, 1954.

Mr. Clifton Swift, Meat and Meat Products Section, obtained information on the use of phosphates in making sausage. Dr. Sharp gave data (unpublished at the time of his visit) on the swelling effects of polyphosphates on meats.

Dr. Gustaf Nilsson, Director, Gustaf E. Nilsson & Co., Goteborg, Sweden. November 19, 1954, and

Dr. Tage Soderholm, Technical Manager, Food Pept. of Mensa, Hameenlinna, Finland. December 2, 1954.

Both of the above men gave information on the use of phosphates in meat processing in their talks to Mr. Clifton Swift. It was far broader information than was obtainable in this country. There is a lack of published information in the U. S. on phosphates for such use. Since the U.S.D.A. is doing phosphate work, this information was of much value to us, giving the background of this whole special field. Phosphates are used in curing hams as well as in sausage making.

Research Contribution Made by Foreign Trainee  
At Northern Utilization Research Branch  
by  
W. F. MacIay, Chief

Name of Trainee: Thomas T. C. Shih

Country: Taiwan (Formosa) China

Training Period: July 3, 1953 to April 24, 1954

Problem Studied:

Experimental production of pulps for fine papers and strawboard, utilizing agricultural residues, particularly rice straw and sugarcane bagasse.

Solution of Our Problem:

Mr. Shih was assigned to the Northern Utilization Research Branch for studies in pulp and papermaking involving use of agricultural residues, particularly rice straw and bagasse, under project No. 84-48B-000-3634 of the Industrial Technical Assistance Division of Foreign Operations Administration. The studies made by Mr. Shih were under the supervision of a paper technologist who outlined the program and discussed procedures and analytical methods to be used. While considerable time was consumed for this purpose owing to language difficulties, the actual work on the problem was facilitated because of Mr. Shih's academic training and background.

In the course of the investigations at the Northern Branch, Mr. Shih conducted many pulping experiments with rice straw and bagasse according to pressure and mechanico-chemical pulping procedures used at this laboratory. Mr. Shih performed the chemical analyses of the pulp, and testing and evaluation of the experimental hand sheets produced in the study. These pulps were evaluated on the basis of the applicability for fine papers and strawboards. The net result of Mr. Shih's activities was equivalent to that of an additional professional employee in the Agricultural Residues Section.

During his tour of training, Mr. Shih conducted 26 pulping runs with rice straw—7 with Arkansas rice straw, 11 with Louisiana rice straw, and 8 with Egyptian rice straw. Results of this study have not yet been published, but it is planned that, with data accumulating since Mr. Shih's departure, an extensive report on pulping rice straw will be made. It is estimated that the results obtained by Mr. Shih will constitute 20 to 25 percent of the proposed manuscript.

Work with Formosan bagasse involved 21 cooks with either whole bagasse or separated bagasse. Although the bagasse used was not of domestic origin, much of the experimental data obtained are applicable and of value in our studies with domestic sugarcane bagasse.

Importance of the Contribution:

Immediate importance of Mr. Shih's tour of training at the Northern Branch was the conduct of studies not possible with the normal staff available for such work.

From the standpoint of the pulp and paper industry, results of these studies, which are currently being extended in the present program, will be of ultimate value in considering rice straw as a raw material for pulping to produce fine papers and strawboard.

Evaluation of Contributions by Foreign Trainees  
to U. S. Agriculture  
by Ira A. Lane, Plant Quarantine Branch

In an attempt to summarize the contributions made to the agricultural economy of the United States by those foreign participants who have attended the short courses in Plant Quarantine and Plant Protection, emphasis in this analysis has been placed on those instances involving direct contributions. It is apropos, however, to mention the unquestionable affect in the area of mutual understanding of plant quarantine problems, brought about by personal contact with responsible officials from the various countries of the world. Implementation of the plant quarantine programs in the countries represented by the trainees, will, in time, be reflected in increased consideration, effectiveness of inspection, and adequate certification given to agricultural commodities exported to the United States. The increased effectiveness of country of origin certification will implement our own import regulations and help us to minimize the possibility of plant pest introduction. Increased effectiveness in plant quarantine import regulations based on clear-cut biological needs, improved and newly instituted treatment programs for imported plant products in the various countries should tend to delimit and retard the possible spread of plant pests to those countries. Freedom from such pests could enable these countries to continue and possibly expand their export trade and to meet import regulations of other countries. Improved treatment methods and quarantine practices in the importing countries could enable an expanding import trade in agricultural commodities.

The atmosphere of understanding, respect, and the recognition of strengths and weaknesses inherent in the plant protection systems of the various countries involved, created by the detailed discussions possible in the training program, should form a firmer basis for those international relationships which deal with standardization of plant quarantine procedure and practices.

In the area of direct contributions to our agricultural economy, several instances are of particular importance. We have been fortunate in obtaining published literature on economic plant pests occurring in various parts of the world to supplement our present information. The economic evaluation of plant pests not known to occur in the United States is one of the more important evaluations made in the determination of entry status of agricultural commodities. The effectiveness of this evaluation is directly related to the technical

information available. Trainees from Brazil, Formosa, Germany, Jordan, Peru, and Turkey have made contributions of this nature. Preserved plant pest specimens have been received from technicians who have returned home, which materially aid technicians in the Branch in the identification of these injurious forms.

Dr. Hans Goffart of West Germany, during his visit, presented the Branch technician working on nematodes, information on preparation and recognition techniques in handling these important plant organisms.

In one instance, a young Greek technician, upon his return home, instituted field procedure for the detection of the Golden Nematode, Heterodera restochiensis, of Irish potato, not previously known to exist in Greece.. The discovery of the pest in Greece, its rapid confirmation by technicians in this country has considerable consequence for his country. In addition, the prompt transmission of this information to interested officials in the United States will permit the taking of necessary quarantine action on our part to regulate the movement of materials originating in Greece which may carry the organism. It is believed that an almost identical story can be told concerning the discovery of this same organism in Peru. Peru reported on this organism shortly after the return of one of their technicians, who had been trained in the detection of the Golden Nematode.

Nearly all of the foreign trainees have been instrumental, through translations and technical interpretations of the import regulations of their home countries in providing us with clarified versions of these regulations. We are thus enabled to provide more effective certification service to exporters of American grown agricultural commodities shipped abroad.

Resume of period spent at Eastern Regional Research Laboratory  
by Vittorio L. Satta as a Foreign Trainee  
by R. E. Lothrop

Name: Vittorio L. Satta

Country: Italy

Time spent at Eastern Regional Research Laboratory: 72 weeks (May 31, 1949 through October 20, 1950).

Problem studied: Preparation and polymerization behavior of various monomers, in conjunction with studies under line project RRL-4-6-C-2-3: Synthetic rubbers, resins and resinous products from unsaturated intermediates obtainable from lactic acid.

Dr. Satta did research on various aspects of high polymer chemistry. He prepared and purified several monomers, some of which were new compounds. These and other monomers were polymerized by different techniques to obtain polymers and copolymers having special properties. This work was part of the program on finding new uses for milk byproducts via the polymerization of unsaturated intermediates derived from lactic acid.

This program had already developed Lactoprene FV (an acrylic elastomer which was adopted by industry), but there was interest in developing new acrylic elastomers with low-temperature properties superior to those of FV. These new elastomers were subsequently developed and designated Lactoprene BN and Lactoprene FN.

Contribution to the solution: Dr. Satta prepared numerous copolymers and investigated various polymerization methods. This called for the synthesis of many monomers required for copolymerization. Some of these monomers were new compounds and the preparative work was published as a scientific paper (J. Am. Chem. Soc., 75, 4101 (1953)).

The work which Dr. Satta did was an integral part of the study of lactic acid derivatives. If it had not been done by him, a staff scientist's time would have been required to carry out this work.

Importance of the contribution: The study of acrylic polymers and copolymers provided the basis for the development of Lactoprene FV, and later of Lactoprene BN and Lactoprene FN, both of which have been adopted by industry.

Dr. Satta's work provided some of the background data and experience which was helpful in the development. He did not, however, participate directly in the development of BN or FN.

Contribution of Foreign Trainee Program to Utilization  
Research on Southern Farm Crops -- A Report from the  
Southern Utilization Research Branch  
by J. A. Kime

Since 1943 research investigations by foreign scientists working in the Southern Utilization Research Branch have contributed scientific knowledge, advancing the utilization of US-grown farm crops. Most of the new findings, some fundamental in nature, concerned vegetable oil-bearing materials such as cottonseed, sesame, and rice bran. Particularly outstanding was the research on sesame, which provided data on seed of domestic growth, development of improved methods for determining minor constituents, and the effect of variation of minor constituents and composition on the keeping quality of the oil. Results on other commodities, while less striking, are almost as significant. Two foreign scientists contributed many hours of careful scientific work on rice bran. Because the information developed helped contribute to the increased production of rice oil in the United States, their names were included with 13 SURB chemists in the Department's Rice Bran Oil Superior Service Award given in 1952. Two trainees are coinventors on three pending applications for patents on refining rice oil.

A good indication of the tangible evidence on the contribution of foreign trainees to the utilization of domestic commodities is the fact that as of January 1, 1955, twenty-one publications have come from SURB, authored or coauthored by a trainee. In addition, a number of manuscripts and applications for patents are in process.

The contribution of the trainee program may be analyzed in another way. A trainee is usually accepted on the basis that he will work on a problem directly related to SURB's research program, selected at the time of reporting. Those staying but 2 or 3 months work to improve specific techniques but do not undertake an original research problem. Under this plan, SURB obtains scientific manpower at the cost of supervision, related services, and overhead. In round figures, the cost to the Branch of an employee working at the bench is slightly more than all other costs put together. Therefore, for each dollar invested in the foreign trainee program about one dollar of scientific manpower was obtained at no direct cost to SURB. Approximately 20 man years of professional scientific effort have been expended on US-grown crops by foreign scientists stationed in SURB. Since 1943, 38 foreign scientists have been stationed in SURB for a sufficient length of time to be classed as trainees. One remained 17 months, another 16 months, and a total of 7 stayed 12 months or more. Benefit accrues only from foreign scientists who stayed for an extended period. Even in these cases the investment in supervisory time is a significant item. In SURB's experience only one in 10 of the foreign trainees can take hold of a problem and carry out the experimental work without considerable direct supervision. In general, the information obtained from most of the scientists visiting for a day or two does not pay for the effort expended.

#### 20 Countries Represented

The 38 guest scientists stationed in SURB came from 20 foreign countries, 10 in the eastern hemisphere, 10 in the western. The name of each country, its hemispheric location, and the number of representatives are shown in the following table.

Western Hemisphere		Eastern Hemisphere	
Country	Scientists	Country	Scientists
Argentina	4	China	5
Brazil	1	Denmark	2
Colombia	1	Egypt	1
Cuba	1	Holland	1
El Salvador	1	India	7
Honduras	1	Lebanon	1
Mexico	1	Morocco	1
Paraguay	1	Pakistan	2
Peru	2	Thailand	3
Venezuela	<u>1</u>	<u>Turkey</u>	<u>1</u>
Totals 10	14	10	24

### Range of Investigations

Most of the visiting scientists who came in the early stages of this program were interested in extending their knowledge and improving their techniques in the chemistry of oilseeds and vegetable oils. As the trainee program continued the number of commodities studied have been extended to include cotton lint and oranges. In addition, solvent processing of oilseeds and broad phases of food technology were studied.

Data and information are available for evaluating the technical contribution of the guest scientists to the processing and utilization of American-grown crops. One yardstick for measuring the contribution is to list the commodities investigated and the number of published articles, manuscripts in process of publication, and complete technical reports for intra-departmental use. The record in this respect is summarized in the following tabulation:

<u>Commodity</u>	<u>Published Article</u>	<u>Report or Manuscript for Publication</u>	<u>Applications for Patent</u>
Cotton	-	2	-
Cottonseed	3	5	-
Peanuts	2	1	-
Rice Bran	3	1	3
Safflower	1	-	-
Sesame	9	1	-
Okraseed	1	-	-
Buffalo Gourd	1	-	-
Lalob Kernels	<u>1</u>	<u>-</u>	<u>-</u>
Totals	21	10	3

### Significant Commodity Investigations

Rice. Beginning in 1946 SURB undertook a continuing series of investigations on the extraction of oil from rice bran and on the composition and properties of the oil. At the time this work started technical data of this nature was scant. The scientific efforts of foreign trainees contributed heavily to the program. Dr. K. S. Murti and P. B. V. Reddi, two scientists from India, were author or coauthor on 3 technical reports published in 1948 and 1949. During 1954 Mrs. Sakuntala Bhodhiprasart and Mrs. Rabieb Prachankadee, two female scientists from Thailand, conducted research to reduce the excessive refining loss which occurs in the processing of crude rice oil. Their work contributed to the development of an improved technique, which on a laboratory scale,

offers promise in alleviating this major problem of the domestice rice oil industry. Work in which these two trainees participated is described in three applications for patent and one report planned for publication.

Cottonseed. Six foreign scientists have participated in investigations on cottonseed. Mr. F. W. Cheng of China measured the viscosities of cottonseed protein dispersions, prepared in different ways. J. G. Kroonen of Holland studied the refining of domestic cottonseed oil to develop methods of producing oils of lighter color. He studied high rates of agitation and shearing action as a means of increasing the removal of color bodies. S. A. Hussain of India designed a nomograph for calculating the fatty acid composition of oils and fats from certain analytical data. Werner Landmann of Paraguay measured the consistencies of mixtures of cottonseed and certain other vegetable oils. Marco L. Paredes of Honduras and B. S. Kulkarni of India participated in a series of investigations relating to the solvent processing of cottonseed. Results of the first three investigations have been published and plans have been made to publish the results of the others.

Sesame. Probably the most outstanding instance of fruitful contribution of foreign trainees to the research program of the Southern Utilization Research Branch and to development of information of importance and value to American agriculture and related industries is the investigation on the composition and utilization of sesame seed oil conducted from 1948 to early 1952. This investigation is one of the most systematic and thorough ever accorded the composition and properties of a vegetable oil.

Since ancient times sesame has been an oilseed crop of economic and industrial importance in many areas of the old world. In recent years it has been introduced increasingly into Central America and many countries of South America as a source of vegetable oil to offset serious fat deficiencies. At the time research on sesame oil was initiated by the Southern Utilization Research Branch, sesame had aroused considerable interest and activity on the part of a number of state experiment stations in the Cotton Belt and the cottonseed crushing industry. By virtue of the high yield and quality of the oil, and the adaptability of sesame to production in many parts of the South, the crop offers attractive possibilities as a supplement or replacement for cottonseed as a source of oil. Several experiment stations and private research organizations were active in selection and breeding of varieties of strains best adapted for production under U. S. conditions.

Despite the ancient history and importance of sesame in other parts of the world, there was relatively little published scientific information on the composition and properties of the oil which contains more unusual components and exhibits more unusual chemical and physiological properties than other common edible oils. An intensive and systematic investigation was very timely.

A trainee from Lebanon, Dr. Victor Andraos, contributed to exploratory work on the solvent extraction of sesame oil and on its chemical and physical properties and processing characteristics. In November, 1948, a particularly well qualified trainee, Dr. Pierre Budowski, from Venezuela, was assigned to the project and spear-headed a series of progressive investigations for the ensuing 17 months. Another trainee from India, Mr. Frederick G. J. Menezes, made important contributions to some phases of the research during 1949. These investigations included the chemical and physical characteristics and composition

of the oil; processing of the oil into finished products and the properties and characteristics of these products; and the minor constituents, such as sesamin, sesamolin, and sesamol, and their relation to the high stability of sesame oil and its derived bleached and hydrogenated products. Some of these constituents are also of interest as possible byproducts of processing sesame oil. The highly desirable characteristics of sesame oil, especially with respect to ease of processing and quality of the products (including very high resistance toward oxidative rancidity after hydrogenation) were demonstrated. Dr. Budowski was sole or joint author of seven published scientific papers reporting the findings of this research.

Dr. Budowski had to return to Venezuela at the end of March, 1950, before full completion of the investigations. Work was renewed in September, 1950, by Mr. Carlos Suarez, a trainee from Colombia. Between that date and February, 1952, Mr. Suarez made further significant contributions to the chemistry of sesame seed and its derived products, particularly in development of methods for quantitatively determining in sesame concentrates and sesame oils the potentially valuable byproducts, sesamin, sesamolin, and sesamol.

The sesame investigations were rounded out by bench-scale investigations which indicated the feasibility of application to sesame seed of direct solvent extraction using the filtration-extraction process. A trainee from Honduras, Mr. M. L. Parades contributed to this work.

The sesame oil investigations resulted in a total of 9 scientific publications and one report pending publication. The findings attracted world-wide attention and interest.



